A NEW SPIDER GENUS (ARANEAE: AMAUROBIOIDEA) FROM RAINFORESTS OF QUEENSLAND, AUSTRALIA

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Malala gen.nov. is described and its relationships discussed; descriptions of two new species, *Malala lubinae* sp.nov. and *Malala gallonae* sp.nov. are given, including their spigot morphology. *Malala* is considered *incertae sedis* within the Amaurobioidea (*sensu* Lehtinen).□*Araneae, Amaurobioidea, new taxa, spigot morphology.*

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Many amaurobioid spiders in Australia no longer spin a web; they are usually vagrants either in litter or foliage and typically the forelegs have strong ventral spination. Two species of a tree-frequenting genus are described here.

ABBREVIATIONS. Measurements: cephalothorax length (CL) and width (CW), abdomen length (AL) and width (AW). Eyes: anterior median (AME), anterior lateral (ALE), posterior median (PME), posterior lateral (PLE), anterior row (AR), posterior row (PR). Spinnerets: anterior (ALS), median (PMS), posterior (PLS). Collectors: R.J. Raven (RJR), N. Hall (NH), V.E. Davies (VED). *On figures*: **ac** aciniform spigot; **als**, anterior spinneret; **at**, anal tubercle; **c**, conductor; **cp**, protuberance on ♂ chelicera; **cy**, cylindrical spigot; **e**, embolus; **fb**, frontal bristle on ♂ chelicera; **fs**, frontal spur on ♂ chelicera; **Map**, major ampullate spigot; **map**, minor ampullate spigot; **ms**, median sclerite; **n**, nubbin; **pi**, piriform spigot; **pls**, posterior spinneret; **tf**, tegular flange; **to**, tarsal organ. All specimens are lodged in the Queensland Museum.

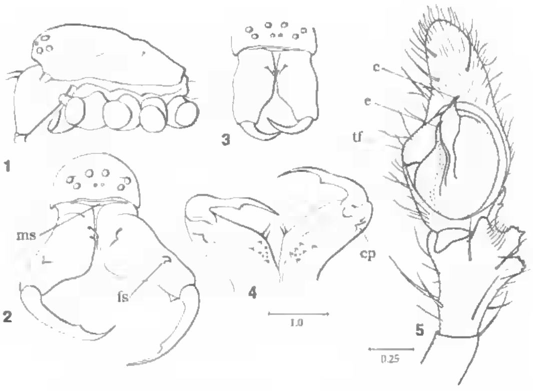
Malala gen. nov.

TYPE SPECIES

Malala lubinae, sp. nov.

DIAGNOSIS

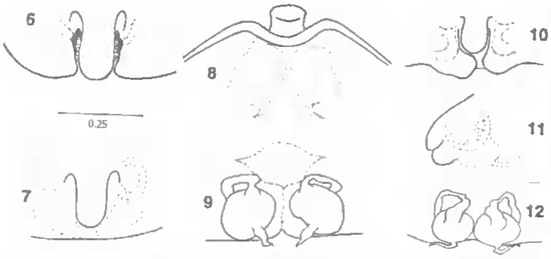
Three-clawed, pale clubionine-like with long spinose legs. Eyes in almost straight rows; AME much smaller than other eyes. Narrow median sclerite above chelicerae. Chelicera with one or two long frontal bristles proximally; pointed frontal spur distally in ♂. ♂ palp without median apophysis; elaborate tibial apophysis with dorso-retrolateral element.



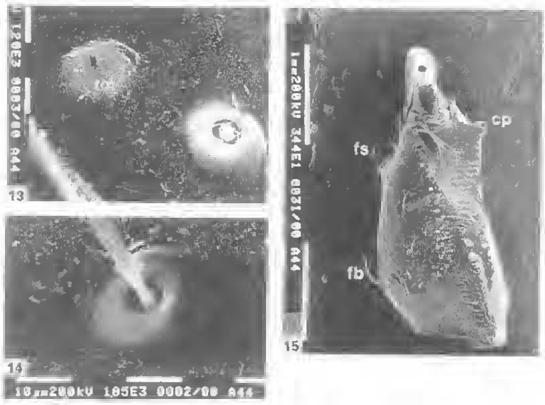
FIGS 1-5. *Malala lubinae*. 1, 3, ♀. 1, cephalothorax (lateral), 3, eyes and chelicerae (frontal), 2, 4, 5, ♂. 2, eyes and chelicerae (frontal), 4, chelicerae (ventral), 5, palp (ventral).

DESCRIPTION

Straw-coloured ecribellate spiders with little or no pattern on abdomen. Carapace rounded dorsally, gradually declining in height behind fovea (Fig. 1). Anterior row of eyes straight, posterior row slightly recurved from above, procurved from front. Canoe-shaped tapetum in indirect eyes. Clypeus x 2 AME; narrow median sclerite above chelicerae (Figs 2,3). Sternum longer than wide, broadly truncate anteriorly, pointed posteriorly. Labium about as wide as long, a little more than half the length of the endite. Four-5 retromarginal cheliceral teeth; proximal ridge leading to 3-5 promarginal teeth, 2 small medial teeth between first and second marginals. Without long retrolateral filamentous setae at base of fang. Legs long (1243), trochanters unnotched. Coxae I longer than IV. Without plumose (ciliate) hairs on body or legs. Numerous strong ventral spines on tibiae and metatarsi I and



FIGS 6-12. *Malala* spp. epigyna. 6-9, *M. lubinae*, ventral, ventral (cleared), posterior, dorsal. 10-12, *M. gallonae*, ventral, lateral, dorsal.



FIGS 13-15. *Malala lubinae*. 13, tarsal organ and bothrium, 14, trichobothrial base, 15, ♂, chelicera (prolateroventral).

II; metatarsi long, without preening combs; tarsi short. Trichobothria in a single row on metatarsi and tarsi. Bothria grooved, collariform (Fig. 14); tarsal organ with pear-shaped opening (Fig. 13). Superior claws 7-8 teeth, inferior claw 2 teeth; 2 pairs of fringed accessory claw setae present; ♀ palpal claw 2-3 teeth. Colulus. Spinnerets: ALS much larger than PLS; one major ampullate (gland) spigot and nubbin on ALS. Epigynum small with scape-like median structure; anterior gonopores. Male palp with spiniform embolus, membraneous conductor. Tibial apophysis with 3 processes; the anterior process branched or unbranched, the posterior ones 'toothed' and facing each other. Respiratory system with 4 tracheal tubes in abdomen; broad inner tubes branching and rebranching; slender outer tubes simple.

ETYMOLOGY

The generic name is derived from 'malal' an aboriginal word for spider.

Malala lubinae sp. nov.

(Figs 1-9, 13-17, 20-27)

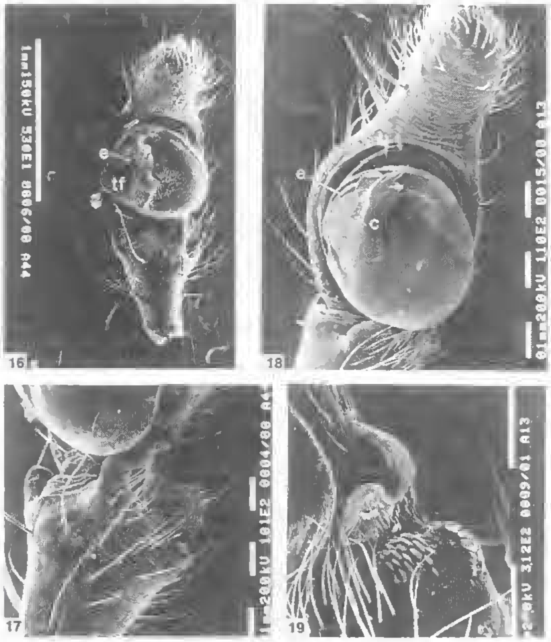
MATERIAL EXAMINED

TYPES. Lamington National Park, southeastern Queensland. Holotype: ♀, Nagarigoon, 8.iv.1976, VED, NH, S20349. Paratypes: Nagarigoon, 1 ♂, 8.iv.1976, VED, NH, S20350; 4 ♀, 2 j, S20351; Binna Burra, 1 ♂, 1 ♀, 27-30.iii.1976, RJR, VED, S20352; 5 ♀, 11-12.ii.1981, Y. Lubin, RJR, VED, S20353; 1 ♀ with spiderlings in sealed leaf, S20354; Mt Hobwee, 1 ♀, 3-8.iv.1976, RJR, VED, S20355; O'-Reillys, 1 ♂, 15-16.xi.77, VED, E. Dahms, S20356.

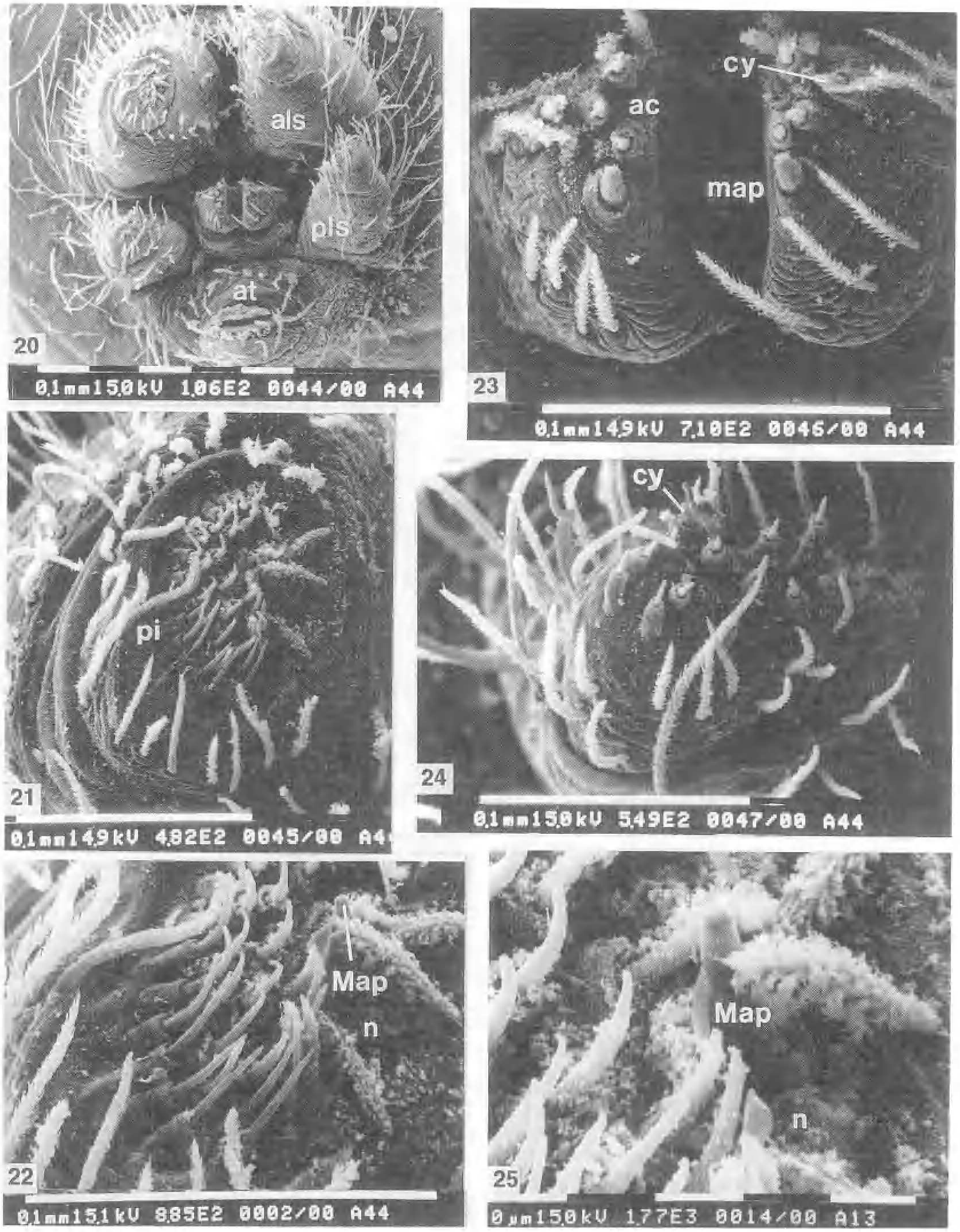
DESCRIPTION

Female: CL 3.6, CW 2.6, AL 3.8, AW 2.5. Ratio of AME:ALE:PME:PLE is 4:10:9:10; width of AR is 21, PR is 25. Sternum longer than wide 1:0.8; endite 1:0.6. Chelicera with 5 retromarginal teeth and 5 promarginal; second proximal tooth largest. Chelicera with 2 stout frontal bristles; low retrolateral swelling near base of fang; fang with slight ventral projection. Length of coxae I:IV is 1:0.6. Leg measurements are given in Table I.

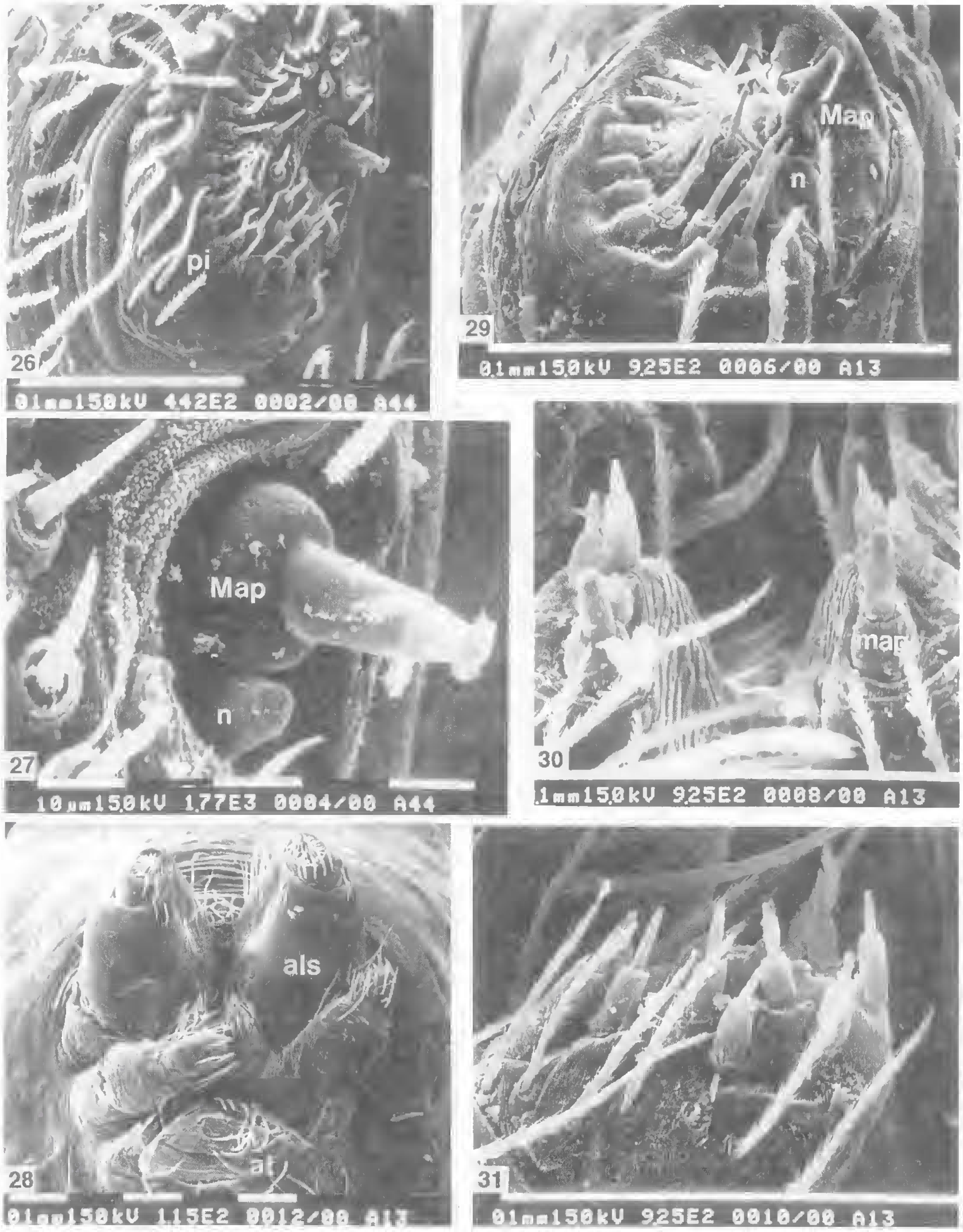
Notation of spines. Femora: palpi, D0-1-1; I, D1-1-1, PO-0-2, RO-0-2; II, D1-1-1, PO-1-2, R0-1-1; III, D0-1-1, PO-2-1, RO-1-1; IV, D1-1-1, PO-0-1, R0-0-1. Patellae: palpi, D0-0-1; Tibiae:



FIGS 16-19. ♂ palps. 16, 17, *M. lubinae*. 16, left palp, 17, tibial apophysis. 18, 19, *M. gallonae*. 18, left palp, 19, tibial apophysis.


als
pls
at
20
0.1mm15.0kV 1.06E2 0044/00 A44
cy
ac
map
23
0.1mm14.9kV 7.10E2 0046/00 A44
pi
21
0.1mm14.9kV 4.82E2 0045/00 A4
cy
24
0.1mm15.0kV 5.49E2 0047/00 A44
Map
n
22
0.1mm15.1kV 8.85E2 0002/00 A44
Map
n
25
0μm15.0kV 1.77E3 0014/00 A13

FIGS 20-25. ♀ *M. lubinae* spinnerets. 20, spinneret group. 21, 22, 25, right ALS. 23, PMS. 24, right PLS.


26
pi
01mm150kV 442E2 0002/00 A44
29
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1mm150kV 925E2 0008/00 A13
28
als
at
01mm150kV 115E2 0012/00 A13
31
01mm150kV 925E2 0010/00 A13

FIGS 26-31. *Malala* spp. spinnerets. 26, 27, penultimate ♀ *M. lubinae*. 26, right ALS, 27, major ampullate spigot and nubbin on ALS. 28-31 ♂ *M. gallonae*. 28, spinneret group, 29, right ALS, 30, PMS, 31, left PLS.

palpi, D1-0-1, P1-1-0; I, P2-1-1, V7-6-2, R1-1-1; II, P2-1-1, V5-5-1, R1-2-0. III, P2-1-0, V2-1-2, R2-1-0; IV p1-1-1, V1-1-2, R1-1-1. Metatarsi: I, P2-2-1, V4-3-1, R1-1-1; II P2-1-1, V4-2-3, R1-1-2; III, D2-2-2, P1-0-1, V2-2-1, R1-0-1; IV, D2-2-2, P1-0-1, V2-2-1, R0-1-1. Tarsi: palpi, P2-1-0, V0-0-2. Palpal tarsi swollen distally. Dorsal abdomen with slight foliate pattern. Epigynum very small (Figs 6-9).

Spinnerets: ALS much larger than PLS (Fig. 20). ALS with one large major ampullate spigot (Map), a nubbin (n) and about 30 piriform (pi) spigots arranged in 2 groups (Figs 21, 22, 25). The major ampullate spigot and nubbin are shown more clearly in a penultimate female (Figs 26, 27). PMS (Fig. 23) with large minor ampullate spigot (map), 3 aciniform gland spigots (ac) and one cylindrical gland spigot (cy). PLS (Fig. 24) with one large cylindrical spigot and 10 aciniform spigots.

Other females varied in size: CL 2.9-3.9, CW 2.3-2.9, AL 3.5-4.4, AW 2.3-2.8.

Male: CL 3.1, CW 2.3, AL 3.3, AW 2.0. Ratio of AME:ALE:PME:PLE is 5:9:8:9. Chelicerae divergent; 2 stout setae (fb) crossing over frontally with lesser one above; pointed spur (fs) distal to these. Four teeth on retromargin of chelicera, 4 on promargin; conical protuberance (cp) near base of fang; fang long with marked ventral projection (Figs 2,4,15). Length of coxae I:IV is 1:0.7. Leg measurements are given in Table I.

Notation of spines: Femora: palpi, D0-1-1; I, D1-1-1, P0-0-2, R0-1-1, II, D1-1-1, P0-2-1, R0-1-2; III, D0-1-1, P0-1-1, R0-1-1; IV, D1-1-1, P0-0-1, R0-0-1. Patellae: palpi, D0-0-1. Tibiae: I, P2-1-1, V7-4-1, R1-1-1; II, P2-1-1, V6-4-1, R1-1-1; III, P2-1-0, V2-1-2, R1-1-1; IV, P2-0-1, V1-1-2, R1-1-1. Metatarsi: I, P2-1-1, V4-2-2, R1-1-1; II, P2-1-1, V3-3-2, R1-1-1; III, D0-1-1, P2-0-1, V3-2-2, R1-1-1; IV, D0-1-1, P1-1-1, V2-2-2, R1-1-1.

♂ palp (Figs 5,15): tegulum extended to form anterior prolateral flange; embolus, arising ventrally on tegulum, tapers to a point; conductor membraneous with pointed sclerotized tip; cymbial tip shorter than length of tegulum. Tibia with 3 retrolateral processes, the anterior one branched.

Variation in size: CL 3.1-3.3, CW 2.4-2.5, AL 3.6-3.8, AW 2.1-2.2.

BIOLOGY

The spiders were collected from branches or foliage of trees in the rainforest. The egg sac was placed with the spider in a sealed portion of the prickly leaf blade of *Calamus muelleri*, the lawyer vine.

Malala gallonae sp. nov.
(Figs 10-12, 18, 19, 28-31)

MATERIAL EXAMINED

TYPES. Holotype: ♀, Bellenden Ker Range, 1054 m, 17.x-24.xi.1981, Earthwatch/ Queensland Museum Expedition, S20357. Paratypes. Same data as holotype; 1 ♂, S20358, 1 ♀, S20359; 1 ♀, S20360. 1 ♂, same locality, 25-31.x.1981, S20361. 1 ♂, Malaan State Forest,, 20-4.iv.1978, RJR, VED, S20362. Upper Boulder Creek, 11km NW Tully, 850-1000m, 1 ♀, 17-18.xi.1984, J. Gallon, VED, S20363; 1 ♀, S20364; 1 ♂, 6.xii.89, G.B. Monteith, S20365. All in northeastern Queensland.

Female: CL 2.7, CW 2.0, AL 3.2, AW 1.9. Ratio of AME:ALE:PME:PLE is 4:8:9:8. Chelicerae with single stout elongate frontal bristles crossing each other. Four retromarginal, 3-4 promarginal teeth on chelicerae. Fang with slight ventral projection. Length of coxae 1:IV is 1:0.8. Leg measurements are given in Table I.

Notation of spines: Femora: palpi, D0-0-1; I, D1-1-1, P0-2-1, R2-1-2; II, D1-1-1, P0-2-1, R1-2-1; III, D0-1-1, P0-2-1, R0-2-1; IV, D1-1-1, P0-0-1, R0-0-1. Patellae: palpi, D0-0-1. Tibiae: palpi, D1-0-1, P2-1-0; I, P2-1-1, V6-5-1, R2-1-1; II, P2-1-1, V5-5-1, R2-1-1; III, P2-1-0, V0-2-0, R1-2-0; IV P1-1-0, V0-1-0, R1-1-0. Metatarsi: I, P2-1-1, V4-2-3, R1-1-2; II, P2-1-1, V4-2-2, R2-0-1; III, D2-2-2, P1-0-1, V2-2-1, R1-0-1; IV D2-2-2, P1-1-1, V2-2-1, R0-0-1. Epigynum (Figs 10-12).

Variation in size: CL 2.6-2.8, CW 2.0-2.1, AL 3.0-3.4, AW 1.8-2.5.

Male: CL 2.4, CW 1.8, AL 2.9, AW 1.4. Ratio of AME:ALE:PME:PLE is 4:8:9:8. Chelicerae slightly divergent; single enlarged setae crossing over frontally, pointed spur distally; without protuberance near base of fang. Three retromarginal, 4 promarginal teeth. Leg measurements are given in Table 1. Notation of spines is similar to ♂ *M. lubinae*.

♂ palp (Figs 18,19): tegulum without prolateral flange, embolus arising prolaterally. Cymbium tip a little shorter than length of tegulum. Tibia with 3 retrolateral processes, the anterior one with 2 branches.

Spinnerets: ALS (Fig. 29) have a large major ampullate spigot, a nubbin and about 20 piriform spigots. PMS (Fig. 30) have a large minor ampul-

TABLE 1. Leg measurements (mm) of *Malala* spp. *Bowed.

Leg	Fe	Pa	Ti	Me	Ta	Total
M. lubinae						
♀ palp	1.5	0.5	0.9	-	1.3	4.2
I	3.5	1.2	3.9	3.1	0.9	12.6
II	2.7	1.2	3.0	2.6	0.8	10.3
III	2.0	1.0	1.6	2.0	0.7	7.3
IV	2.6	1.0	2.3	2.9	0.9	9.7
♂ palp	1.5*	0.5	0.7	-	1.2	3.9
I	3.2	1.2	3.7	3.1	1.0	12.2
II	2.5	1.0	2.8	2.5	0.9	9.7
III	1.9	0.8	1.2	1.8	0.7	6.4
IV	2.3	0.9	2.1	2.5	0.8	8.6
M. gallonae						
♀ palp	1.1	0.5	0.7	-	1.0	3.3
I	3.1	1.0	3.6	3.1	0.9	11.7
II	2.6	1.0	2.9	2.6	0.8	9.9
III	1.8	0.8	1.5	1.9	0.6	6.6
IV	2.3	0.8	2.0	2.5	0.8	8.4
♂ palp	1.1	0.4	0.5	-	1.2	3.2
I	2.9	1.0	3.9	3.1	0.9	11.8
II	2.5	0.9	2.7	2.5	0.8	9.4
III	1.8	0.7	1.3	1.8	0.6	6.2
IV	2.0	0.7	1.8	2.3	0.7	7.5

late spigot and 3 aciniform spigots. PLS (Fig. 31) have 10 aciniform spigots.

Variation in size: CL 2.0-2.8, CW 2.0.

DISCUSSION

Malala, a 3-clawed ecribellate, has a single row of tarsal trichobothria of increasing length distally and a single row of metatarsal trichobothria. The ♂ palp has a complex tibial apophysis and no median apophysis. The ♂ chelicerae diverge distally and have a pointed frontal spur distally. The median tracheal trunks are branched. The anterior lateral spinnerets have one major ampullate gland spigot and a nubbin. From these and other characters *Malala* clearly belongs in the amaurobioid/dictynoid complex of families. In his world revision of cribellates, Lehtinen (1967) recognised one major superfamily Amaurobioidea with 6 families. Describing New Zealand spiders, Forster (1970) and Forster and Wilton (1973) defined two groups, Dictynoidea and Amaurobioidea, based on the branching or non-branching respectively of the median tracheal trunks. However, Gray (1983) found that *Forsterina*, an acknowledged close relative of *Badunna* (classified by Forster and Wilton in Desidae: Dictynoidea) has simple median trunks thus invalidating the branching as a synapomorphy for the dictynoids. Gray's evidence suggests that the branching may be important only at the generic level in the same way as the extension of the trunks into the cephalothorax is regarded. In their recent paper on the higher systematics of Araneae, Coddington and Levi (1991) state that 'these superfamilies are among the largest cladistic problems at the family level' and that the difficulty of definition 'partly stems from heterogeneity within families'. I would add that the few Australian genera on which some of these families are based compared with the large number yet to be described, also contributes to this difficulty.

Most Australian rainforest cribellates which range in size from small to very large have a nondescript but recognisable abdominal pattern (see Lehtinen, 1967: 435), a divided cribellar field, a single row of tarsal trichobothria increasing in length distally and a row of metatarsal trichobothria. The ♂ palp has a complex tibial apophysis and a median apophysis is usually present. I am persuaded to return to Lehtinen's classification and regard these Australian spiders as belonging in the Amaurobioidea.

Only one dictynid, *Callevophthalmus* is described from Australia. It is found in grassland and open forest and not, so far as I know, in rainforest. It is a small spider with a distinct abdominal pattern and an entire cribellar field. It has no tarsal trichobothria and a single metatarsal trichobothrium. The ♂ palp has a small tibial apophysis, a large T-shaped conductor extending beyond the edge of the cymbium retrolaterally and has no median apophysis. The ♂ chelicerae are indented prolaterally and have a proximal frontal process; these modifications do not appear to be homologous with those of *Malala*. *Callevophthalmus* is similar to *Arangina* from New Zealand and to *Dictyna*.

This is the first description of spigot morphology in an ecribellate amaurobioid. In general, cursorial spiders use silk only as a drag-line, and for the construction of the cocoon in the ♀. Thus, it is expected they will have fewer kinds of spigots than the web-spinning (cribellate) amaurobioids. *Malala* has 3 aciniform spigots on the PMS and 10 on the PLS. The typical small aciniform spigots which provide silk for swathing prey (Kovoor, 1987) are not present in *Malala*. The lack of these in contrast to their abundance in cribellate amaurobioids and dictynoids (Coddington, 1990b) is probably associated with

Malala's nomadic existence. The presence of one major ampullate gland spigot (Map) and a nubbin on the ALS is found in dictynoids (notably in *Dictyna*) and in the Orbiculariae (Coddington, 1990a) as well as in some other taxa (Platnick *et al.*, 1991). The nubbin (presumably a remnant of a second major ampullate spigot) may be homoplasious in *Malala*.

The fringed accessory claw setae present in *Malala* are probably an adaptation to tree- or foliage-dwelling and are similar to those found in some New Zealand spiders (Forster, 1970; figs 28-31) from a similar habitat. They are unlike the serrate setae which are involved in handling silk in araneoids. The presence of a narrow median sclerite above the chelicerae in *Malala* may be apomorphic. Marples (1962) mentions that a triangular sclerite is present in *Matachia* but not in *Paramatachia*.

At present I am unable to place *Malala* in a family and consider it *incertae sedis* within the Amaurobioidea (*sensu* Lehtinen).

ACKNOWLEDGEMENTS

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